



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL SENIOR  
CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P2**

**JUNE 2020**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 13 pages.**

**PRINCIPLES RELATED TO MARKING LIFE SCIENCES**

1. **If more information than marks allocated is given**  
Stop marking when maximum marks is reached and put a wavy line and 'max' in the right-hand margin.
2. **If, for example, three reasons are required and five are given**  
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If whole process is given when only a part of it is required**  
Read all and credit the relevant part.
4. **If comparisons are asked for, but descriptions are given**  
Accept if the differences/similarities are clear.
5. **If tabulation is required, but paragraphs are given**  
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**  
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**  
Candidates will lose marks.
8. **If sequence is muddled and links do not make sense**  
Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.
9. **Non-recognised abbreviations**  
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation, but credit the rest of the answer if correct.
10. **Wrong numbering**  
If answer fits into the correct sequence of questions, but the wrong number is given, it is acceptable.
11. **If language used changes the intended meaning**  
Do not accept.
12. **Spelling errors**  
If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names are given in terminology**  
Accept, provided it was accepted at the national memo discussion meeting.
14. **If only the letter is asked for, but only the name is given (and vice versa)**  
Do not credit.

15. **If units are not given in measurements**  
Candidates will lose marks. Memorandum will allocate marks for units separately.
16. **Be sensitive to the sense of an answer, which may be stated in a different way.**
17. **Caption**  
All illustrations (diagrams, graphs, tables, etc.) must have a caption.
18. **Code-switching of official languages (terms and concepts)**  
A single word or two that appear(s) in any official language other than the learner's assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.
19. **Changes to the memorandum**  
No changes must be made to the memoranda. The provincial internal moderator must be consulted, who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).
20. **Official memoranda**  
Only memoranda bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.

**SECTION A****QUESTION 1**

1.1	1.1.1	C✓✓		
	1.1.2	B✓✓		
	1.1.3	C✓✓		
	1.1.4	D✓✓		
	1.1.5	C✓✓		
	1.1.6	A✓✓		
	1.1.7	D✓✓		
	1.1.8	B✓✓		
	1.1.9	C✓✓	(9 x 2)	<b>(18)</b>
1.2	1.2.1	Interphase✓		
	1.2.2	Haemophilia✓		
	1.2.3	Phenotype✓		
	1.2.4	Phylogenetic tree✓/cladogram		
	1.2.5	Artificial selection✓/selective breeding		
	1.2.6	Nucleotides✓		
	1.2.7	Homozygous✓		
	1.2.8	Ribose✓	(8 x 1)	<b>(8)</b>
1.3	1.3.1	A only✓✓		
	1.3.2	B only✓✓		
	1.3.3	B only✓✓	(3 x 2)	<b>(6)</b>
1.4	1.4.1	- Chromosomes are arranged in pairs at the equator✓ - Crossing over✓occurred		(2)
	1.4.2	Anther✓/ovary/ovule		(1)
	1.4.3	(a) Cell membrane✓ (b) Metaphase I✓		(1) (1) <b>(5)</b>
1.5	1.5.1	It involves the crossing of two characteristics✓		(1)
	1.5.2	(a) BBhh✓✓ (b) bh✓ (c) Brown and short hair✓		(2) (1) (1) <b>(5)</b>

- |     |       |   |                          |
|-----|-------|---|--------------------------|
| 1.6 | 1.6.1 | - <i>Ardipithecus</i> ✓<br>- <i>Australopithecus</i> ✓<br>- <i>Homo</i> ✓ | (3)                      |
|     | 1.6.2 | (a) 3.0 - 2.0✓ mya✓<br>(b) <i>Homo neanderthalensis</i> ✓                 | (2)<br>(1)               |
|     | 1.6.3 | (a) <i>Homo habilis</i> ✓<br>(b) <i>Homo erectus</i> ✓                    | (1)<br>(1)<br><b>(8)</b> |

**TOTAL SECTION A: 50**



2.3.4 **P<sub>1</sub>** Phenotype Unaffected female x Unaffected male✓  
 Genotype  $X^R X^r$  x  $X^R Y$ ✓

*Meiosis*

**G/gametes**  $X^R, X^r$  x  $X^R, Y$ ✓

*Fertilisation*

**F<sub>1</sub>** Genotype  $X^R X^R$   $X^R Y$   $X^R X^r$   $X^r Y$ ✓  
 Phenotype Unaffected; Unaffected; Unaffected; Affected female male female male✓

**P<sub>1</sub> and F<sub>1</sub>**✓  
**Meiosis and fertilisation**✓

OR

**P<sub>1</sub>** Phenotype Unaffected female x Unaffected male✓  
 Genotype  $X^R X^r$  x  $X^R Y$ ✓

*Meiosis*

*Fertilisation*

Gametes	$X^R$	$X^r$
$X^R$	$X^R X^R$	$X^R X^r$
Y	$X^R Y$	$X^r Y$

1 mark for correct gametes✓  
 1 mark for correct genotypes✓

**F<sub>1</sub>** Phenotype Unaffected; Unaffected; Unaffected; Affected female male female male✓

**P<sub>1</sub> and F<sub>1</sub>**✓  
**Meiosis and fertilisation**✓

Any (6)  
(12)

- 2.4 2.4.1 Undifferentiated cells that can develop into any other type of cell✓✓ (2)
- 2.4.2 Mitosis✓ (1)
- 2.4.3 Nervous✓ tissue (1)
- 2.4.4 - It involves killing✓/destroying embryos/human life  
- which is against their religion✓/playing God/interfering with nature (2)
- (Mark first TWO only) (6)**

- 2.5 2.5.1 - Blood groups are controlled by three alleles✓/  $I^A$ ,  $I^B$ ,  $i$   
- Each person can only inherit two alleles✓  
- The combination  $I^A i$  and  $I^A I^A$  produces blood group A✓  
- The combination  $I^B i$  and  $I^B I^B$  produces blood group B✓  
- The combination  $I^A I^B$  produces blood group AB✓  
The combination  $ii$  produces blood group O✓ (6)
- 2.5.2 - Different combinations of blood group A and blood group B can produce blood group O✓  
- Combinations of blood group A or B and blood group O can also produce blood group O✓  
- Combinations of blood group O also produce blood group O✓

**OR**

- There is a high proportion of recessive alleles in the human population✓  
- A recessive allele is present in blood group A and blood group B in their heterozygous condition✓ and  
- present in blood group O in the homozygous condition✓ (3)
- (9)**  
**[40]**

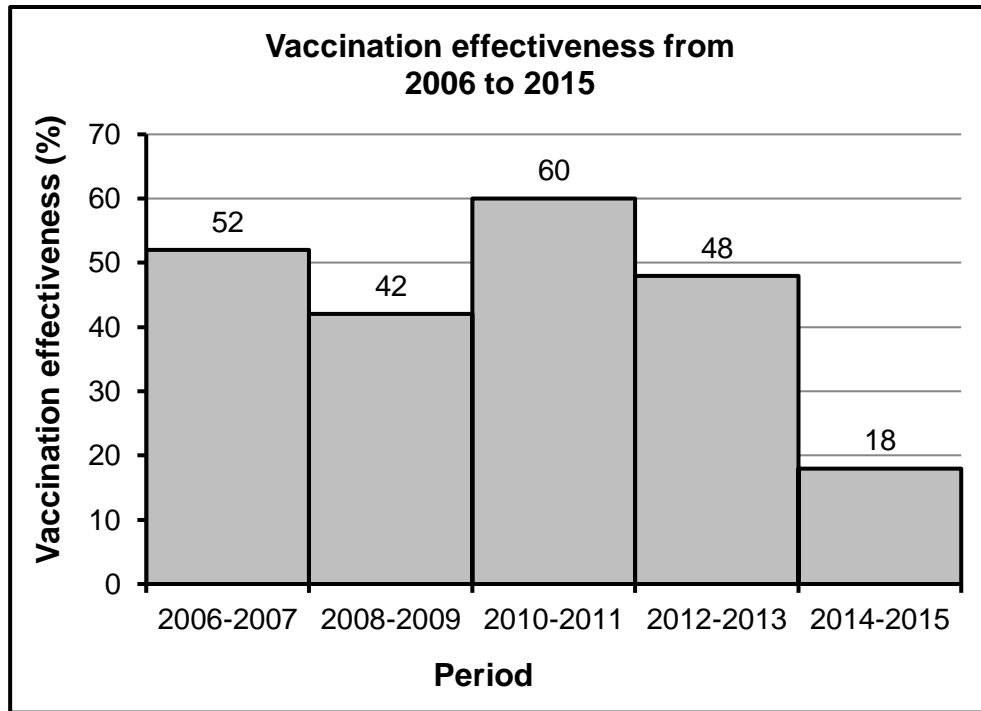


**QUESTION 3**

3.1 3.1.1  $(100 - 48) \checkmark = 52 \checkmark$  (2)

- 3.1.2 - The virus had a high rate of mutation ✓  
 - A new strain of flu virus ✓  
 - resistant to the vaccine ✓ could have emerged Any (2)

3.1.3



**Guideline for assessing the graph**

CRITERION	ELABORATION	MARKS
TYPE	Histogram drawn	1
TITLE	Title of graph includes both variables	1
SCALE	Correct scale for X-axis (equal width of bars) and Y-axis	1
LABELS	Correct label and unit for X-axis and Y-axis	1
DRAWING	Correct drawing of bars	1: 1 to 4 bars drawn correctly 2: All 5 bars drawn correctly

(6)  
(10)



3.3 3.3.1 Hominidae✓ (1)

3.3.2

Skull Y	Skull Z
Less prominent brow ridge✓	Protruding brow ridge✓
Small canines✓	Large canines✓
Small teeth✓	Large teeth✓
Non-prognathous✓	Prognathous jaw✓
Cranial ridge absent✓	Cranial ridge present✓
Large cranium✓	Small cranium✓
Small jaw✓	Large jaw✓

Table✓ + Any (3 x 2) (7)

**(Mark first THREE only)**

3.3.3 - Foramen magnum is in a backward position✓  
 - allowing the spinal cord to enter the skull horizontally✓ thereby  
 - allowing organisms to walk on four legs✓/ quadrupedalism (3)

3.3.4 Diagram III✓ (1)

3.3.5 - The foramen magnum is in the most forward position✓  
 - The palate is more rounded✓ Any (1)

3.3.6 - Taung child✓  
 - Mrs Ples✓  
 - Little foot✓ Any (2)

**(Mark first TWO only)**

**(15)**  
**[40]**

**TOTAL SECTION B: 80**

**SECTION C****QUESTION 4****Effects of gene mutation on protein synthesis**

- During transcription✓
- a gene mutation may affect the arrangement of a single✓/ a few nitrogenous bases
- This would change the order of nitrogenous bases✓/the code
- on mRNA✓
- During translation✓
- as a result of the gene mutation a different amino acid✓ may be coded for
- which causes a change in the amino acid sequence✓ in the protein
- leading to the formation of a different protein✓/ alternate form of the required protein
- If the same amino acid✓ is coded for
- it will have no effect on the protein formed✓

Any (7)

**How a chromosomal mutation may lead to Down syndrome**

- During anaphase I✓
- homologous chromosomes✓
- may fail to separate✓/ nondisjunction
- In anaphase II✓
- nondisjunction of chromatids✓ may occur
- If nondisjunction occurs in chromosome pair 21✓ in humans
- it leads to the formation of an abnormal gamete✓
- with an extra copy of chromosome 21✓
- If the abnormal gamete fuses with a normal gamete✓
- it leads to Down syndrome✓/ Trisomy 21

Any (7)

**Role of mutations in natural selection**

- Mutations are a source of genetic variation✓
- on which natural selection acts✓
- This may lead to the development of favourable characteristics✓/ unfavourable characteristics
- Organisms with favourable characteristics will survive✓
- Those with unfavourable characteristics will die✓

Any (3)

Content: (17)  
 Synthesis: (3)  
**(20)**

**ASSESSING THE PRESENTATION OF THE ESSAY**

<b>Criterion</b>	<b>Relevance (R)</b>	<b>Logical sequence (L)</b>	<b>Comprehensive (C)</b>
<b>Generally</b>	All information provided is relevant to the topic	Ideas are arranged in a logical/cause-effect sequence	All aspects required by the essay have been sufficiently addressed
<b>In this essay in Q4</b>	Only information relevant to: - Effects of gene mutation on protein synthesis, - how a chromosomal mutation leads to Down syndrome and - the role of mutations in natural selection are given There is no irrelevant information.	The description of: - Effects of gene mutation on protein synthesis, - how a chromosomal mutation leads to Down syndrome and - the role of mutations in natural selection is logical and sequential.	At least the following marks should be obtained: - Effects of gene mutation on protein synthesis ( <b>5/7</b> ) - How a chromosomal mutation leads to Down syndrome ( <b>5/7</b> ) - The role of mutations in natural selection ( <b>2/3</b> )
<b>Mark</b>	1	1	1

**TOTAL SECTION C: 20**  
**GRAND TOTAL: 150**